Morphological Exponence and Anti-Integration – Basic Model

There is a language-specific distribution of * and ! features that serve as instructions at PF for the morphological operations of integration and anti-integration. Where integration features are instructions to "roll up" structure up to the label bearing the integration feature, I take anti-integration to be a collapsing of structure downwards into a lower domain of morphological application, as in the case of extra-phasal morphology applying downwards into a previous phase's domain. The idea is that phases are relevant only to narrow syntax, typically in terms of computational economy and memory load. In the narrow syntax, previously spelled out or transfered phases are impenetrable to further operations. The obvious corollary is that PF receives information in phase-sized chunks; however, it does not necessarily follow that PF operations must apply only within the phase. I propose, then, a distinct ontology of morphological and phonological representations and opeations that map from representation to representation on the way towards final A-P mapping.

I. Integration[1]

I take PF processing to occur in several distinct steps, with one step's representation being mapped directly from information in the previous step. Within each step, various morphological operations may apply to prepare the structure for final phonological processing and presentation to A-P.

A. The phase head complement is transferred to PF.

[A* [B [C [X* [Y [Z]]]]]]

B. The phase is defined as a prosodic domain.[2]

[$_{\phi}$ [A* [B [C [X* [Y [Z]]]]]]]

The prosodic domain defined a unit within which all PF operations will be carried out. It is also the unit to which phrasal prosody will ultimately be mapped.

C. Integration features define lexical domains.[3]

[$_{\phi}$ [$_{\omega}$ [A* [B [C]]]] [$_{\omega}$ [X* [Y [Z]]]]]

Lexical domains define units within which morphological operations will be carried out. They are also units to which lexical stress will be mapped.

D. Integration applies.[4]

[$_{\phi}$ [$_{\omega}$ < < < C > B > A >] [$_{\omega}$ < < < Z > Y > X >]]

E. L-Match.[5]

< < < C > B > A >

< C-B > ↔ < *a* >
< A > ↔ < *b* >

< < *a* > *b* >

< < < Z > Y > X >

< Z-Y-X > ↔ < *c* >

< *c* >

F. Exponents define morphological edges (relevant to edge attachment and operations).

[$_{\phi}$ [$_{\omega}$ [$_{\mu}$ [$_{\mu}$ *a*] *b*]] [$_{\omega}$ [$_{\mu}$ *c*]]]

G. Morphological operations apply, particularly antitropal realignment.

[$_{\phi}$ [$_{\omega}$ [$_{\mu}$ [$_{\mu}$ *a*] *b*]] [$_{\omega}$ [$_{\mu}$ *c*]]] → [$_{\phi}$ [$_{\omega}$ [$_{\mu}$ *b* [$_{\mu}$ *a*]]] [$_{\omega}$ [$_{\mu}$ *c*]]]

< *b* > ↛ $_{\mu}$] < *b* > is antitropal with respect to a right morphological edge.

H. Stress domains are delineated on the basis of satisfaction of edge requirements.

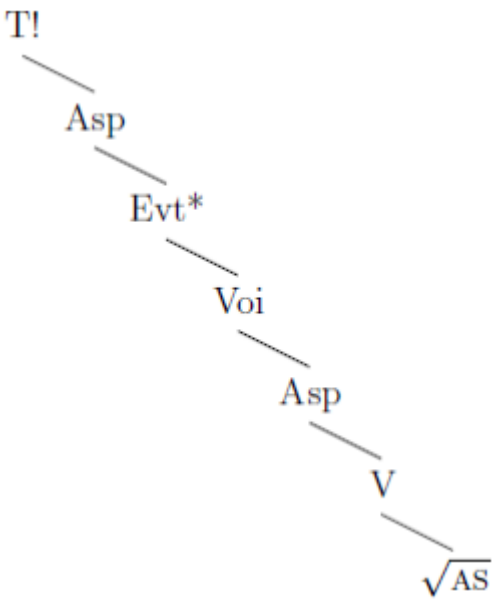
[$_{\phi}$ [$_{\omega}$ [$_{\mu}$ *b* [$_{\mu}$ *a*]]^{L}] [$_{\omega}$ [$_{\mu}$ *c*]^{L}]^{S}]

A particular note here, I do not mean that lexical/sentential stress and phrasal prosody are determined in this step, but instead the *morphological domains* in which they are able to be mapped are specifically delineated. While this may seem dubious, I think it is critical in that (as will be shown with a particular situation in anti-integration below) it defines edges that can be relevant to certain morphological and lexical operations. Some morphological exponents may require a stress-indexed edge to attach to, or certain phrasal infixes (clitics) may require a sententially stress indexed domain to find an appropriate edge of alignment.

II. Anti-Integration

The model for integration as outlined above should be more or less consistent with other proposals of PF morphology. The addition of μ units should be relatively uncontroversial (as they are delineated by edges already provided by the implicit embedding of exponents) but I think they can be useful to leverage certain operations. I think demonstrating how anti-integration can be useful for particular data is the best means of exposition for the basic model.

(1) *as-ac^h-i*
say-AOR-3SG.PAST
"I said" (Eastern Armenian)



The basic structure above lays out the relevant categories relevant to the morphology of *asac^{h}i*. Note that I take the phase to be *Asp* which transfers its complement. I have truncated the *C* phase for the sake of brevity.

I will not diagram in complete detail the steps for integration of the morphological elements of the *Asp* domain. The output of operations in the first phase is given as:

(2) $[_{\phi}\ [_{\omega}\ [_{\mu}\ [_{\mu}\ as\ ]\ ac^h\ ]^{L}\ ]\ ]$

The outermost μ unit is marked as a lexical stress domain. This will become relevant for the morphological information introduced in the next phase.

Second Phase

A. Transfer of *C* complement (truncated).

[T! [Asp [$_\phi$ [$_\omega$ [$_\mu$ [$_\mu$ *as*] *ac*^{h}]^L]]]]

B. The phase is defined as a prosodic domain.

[$_\phi$ [T! [Asp [$_\phi$ [$_\omega$ [$_\mu$ [$_\mu$ *as*] *ac*^{h}]^L]]]]]

C. Anti-integration applies.

[$_\phi$ [$_\phi$ [$_\omega$ < T < Asp [$_\mu$ [$_\mu$ *as*] *ac*^{h}]^L > >]]]

Note that in the case of anti-integration features, no lexical domain is defined since the purpose of anti-integration is to bring extra-phasal structure within a lexical domain of the previous phase.

D. L-Match (and μ unit creation).

< T > ↔ < *i* >

[$_\phi$ [$_\phi$ [$_\omega$ [$_\mu$ *i* [$_\mu$ [$_\mu$ *as*] *ac*^{h}]^L]]]]

E. Morphological operations apply.

< *i* >	↛	[$_\mu$	< *i* > is antitropal
< *i* >	~	]^L	< *i* > requires a lexical stress domain edge feature

[$_\phi$ [$_\phi$ [$_\omega$ [$_\mu$ *i* [$_\mu$ [$_\mu$ *as*] *ac*^{h}]^L]]]] → [$_\phi$ [$_\phi$ [$_\omega$ [$_\mu$ [$_\mu$ [$_\mu$ *as*] *ac*^{h}]^L *i*]]]]

F. Stress domains are delineated.

[$_\phi$ [$_\phi$ [$_\omega$ [$_\mu$ [$_\mu$ [$_\mu$ *as*] *ac*^{h}] *i*]^L]]]

Since < *i* > found a suitable edge to attach to, it is capable of delineating a lexical stress domain.

To illustrate why defining edges for lexical stress mapping is crucial, consider one example from the data set that originally inspired the analysis, the case of the Eastern Armenian second-position verbal auxiliary (which < *i* > is an affixal form of).

(3) *as-ac^{h}-el* *ei*
say-AOR-RET 3SG.PAST
"I have said" (Eastern Armenian)

The structure of (3) has an extra element in the *C* domain, a *T* head bearing a retrospectivity value. We can take (4) as the appropriate structure.

(4) [T!$_{TNS,\phi}$ [T$_{RET}$ [Asp [$_{\phi}$ [$_{\omega}$ [$_{\mu}$ [$_{\mu}$ *as*] *ac^{h}*]^{L}]]]]]

Taking T!$_{TNS,\phi}$ to still L-Match to < *i* > we expect T$_{RET}$ to correspond to < *el* >. We can assume the same operations apply through PF but with a crucial difference at the step of morphology:

(5) [$_{\phi}$ [$_{\phi}$ [$_{\omega}$ [$_{\mu}$ *i* [$_{\mu}$ *el* [$_{\mu}$ [$_{\mu}$ *as*] *ac^{h}*]^{L}]]]]] → [$_{\phi}$ [$_{\phi}$ [$_{\omega}$ [$_{\mu}$ *i* [$_{\mu}$ [$_{\mu}$ [$_{\mu}$ *as*] *ac^{h}*]^{L} *el*]]]]]

We can take < *el* > to be antitropal, and it aligns with the right edge of the morphological unit it is adjacent to. However, note here that assignment of the stress domain does not apply until all processing within this step concludes. We then expect < *i* > to be positioned—but recall, < *i* > requires a lexical stess edge in order to attach. < *el* > effectively intervenes. There is now a conflict between the two specifications for < *i* >, one which tells it to reject a left morphological edge, and another that tells it it can only affix to a lexical stress domain. On the assumption that the entire *ω* unit was previously marked for phrasal stress, a kind of "last resort" operation to rectify the situation with < *i* > is to displace it to a "stronger" stress domain.

(6) [$_{\phi}$ [$_{\phi}$ [$_{\omega}$ [$_{\mu}$ [$_{\mu}$ [$_{\mu}$ *as*] *ac^{h}*] *el*]^{L}]^{S} *(e)i*]]

The auxiliary surfaces with a sort of epenthetical trace vowel provided by the sentential stress unit. Because the domain the auxiliary attaches to is not morphological, its final linearization does not result in actual affixation. Instead it is prosidified as a phrasal unit, exterior to the verb's morphological domain. When arguments are present in the *Asp* phase, they move to a relatively high syntactic site and are obligatorily indexed for sentential stress which ultimately attracts the displaced auxiliary when the environment is such that it does so, thus appearing to have a second-position cliticization effect.

(7) [$_{\phi}$ [$_{\phi}$ [$_{\phi}$ *baŕ*]^{S} [$_{\omega}$ [$_{\mu}$ *i* [$_{\mu}$ [$_{\mu}$ *as*] *ac^{h}*] *el*]]]] → [$_{\phi}$ [$_{\phi}$ [$_{\phi}$ *baŕ*]^{S}=*ei* [$_{\omega}$ [$_{\mu}$ [$_{\mu}$ [$_{\mu}$ *as*] *ac^{h}*] *el*]]]]

An alternative approach might be that sentential stress domains are irrelevant, at least at the morphological level. It is possible that the conflict between specifications for the auxiliary does indeed drive its deficiency, but its actual second position placement is at the phonological level. Because the auxiliary is excluded from the domain of lexical stress (since it did not align to a lexical stress unit itself, it cannot receive stress) it gets stranded from the verb during the final "gluing together" of affixes. Thus the ^{L} feature marks domains for final affixation, and that combined with the auxiliary's resultant deficiency drives its attachment to

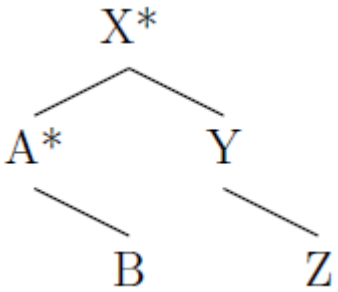
a much stronger prosodic element which carries sentential stress. In effect, it leans on a stronger prosodic unit to repair the deficiency created by the morphological environment. While this alternative is *ceteris paribus* more desirable, as it invokes fewer diacritics to PF representations and seems more conceptually sound (in the sense that we expect phonology-sensitive alternations in expected order to be *phonological*) there is still a case to be made for the former situation, particularly as applied to the case of the Armenian auxiliary clitic in the context of the negation morpheme.

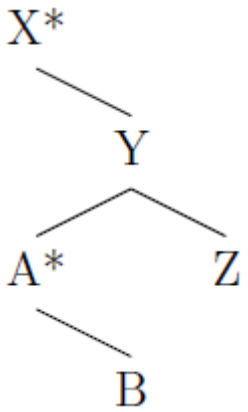
(8) [$_\phi$ [$_\phi$ [$_\omega$ [$_\mu$ [$_\mu$ [$_\mu$ *č* [$_\mu$ *as*]] *ac^h*] *el*]^L]^S *(e)i*]] → [$_\phi$ [$_\phi$ [$_\omega$ [$_\mu$ [$_\mu$ [$_\mu$ *č-ei* [$_\mu$ *as*]] *ac^h*] *el*]^L]^S]]

In the case of (8), there is a close morphological relationship between the negation exponent, < *č* >, and the verbal root. The surface alternation we observe in cases of auxiliary affixation versus cliticization requires that the negation morpheme has not yet been prosodified as an affix within the verbal unit. Observe that when the auxiliary is suffixed, we see *časac^{h}i* "I did not see", but in the case of the clitic, we see *čei asac^{h}el* "I have not seen". The cliticized auxiliary breaks < *č* > from the root which, by hypothesis, is only possible if < *č* > is still in an operational domain where its placement can be "edited" in a manner of speaking. Negative verbs obligatorily take sentential stress even in the presense of other higher predicate-internal arguments, and the negation morpheme attracts the clitic as a host. We could say, as an alternative in alignment with the clitic placement at phonology, that the cliticized < *ei* > strongly resists prosodification as a prefixal element, resulting in the a separate phonological word.

III. A Note About Specifiers

One of the main imports of the anti-integration model is its effect on the linearization of specifier content with respect to the domains of integration. Per Kayne's Linear Correspondence Axiom, specifiers linearize before heads, and heads before complements. Thus taking integration features into consideration, we expect the following:



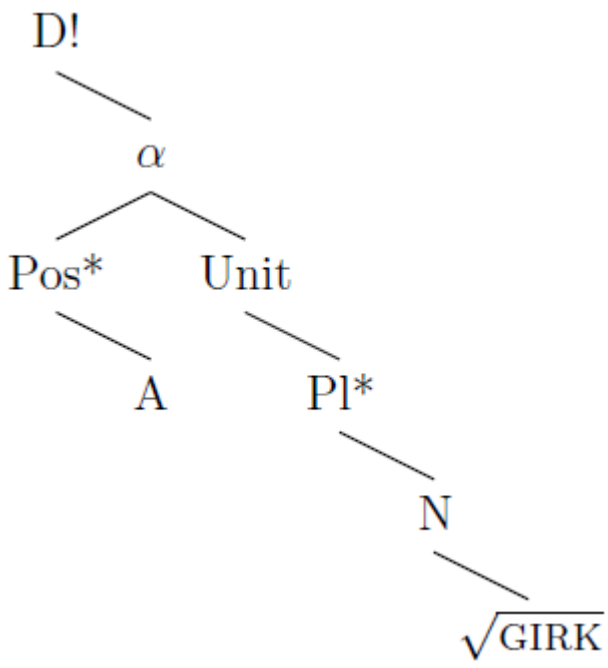


In the first, we get a linearization *BA ZYX* since the specifier of X* linearizes before it. In the

second, we get *ZYX BA* since the argument is more deeply embedded in the structure that integrates to X*. Y and Z integrate with X, and since the argument is not in the specifier of X, it linearizes after the integrated complement line.

Note that this cannot derive effects like English T-to-V where tense from the higher phase suffixes to the lower verbal phase, yet sentential adverbs of the higher phase linearize left of the verb. To provide a toy example of the situation created by anti-integration that can be used to explain this surface ordering, consider the case of Armenian definite morphology:

(9) *lav* *girkʰ-ə*
good *book*-DEF
"the good book"



Taking *Unit* to be a phase head, *Pl** integrates its structure into a unit $_{\text{Pl}}$[√GIRK-N-Pl]. In the processing of the next phae, the anti-integration feature brings the *D-α-Unit* complement line down into the domain of morphological application of the previously processed phase, thus we get definite morphology on the verb. However, *Pos-A* remains in the higher phase, linearizing left of the morphologically complex nominal. If we took *D* to bear a standard integration feature, we would expect the adjective to linearize right of the nominal, as we see in French.

IV. Notes

1. I more or less take the model laid out on Bye & Svenonius 2011 for granted, but with a few critical modifications that I think will prove to ultimately be necessary. Note that although the specific formalism presented here might not be precisely accurate, I think that the generalizations the proposed mechanisms capture are significant.

2. This is in alignment with the B&S model. I take this much to be relatively uncontroversial.

3. Along the same insight as the standard view, integration features should signal "syntactic words" insofar as they define descrete units within which morphology applies. Morphological exponents within a lexical domain will (roughly) map onto a distinct phonological word.

4. Here is the first departure from B&S (inter alia) although only slightly. While the * feature is taken to be the marker of Brodian head movement, I take it to be an instruction for PF to integrate everything below (until it finds another * or ! feature) into a single (lexical) unit. Thus a structure like [X* [Y [Z]]] as demonstrated will map to an isomorphic representation < < < Z > Y > X > which maintains embedding but "rolls up" the structure.

5. While the integrated structure implicitly imposes order on the syntactic elements, I do not think anything is critically lost if we assume that exponents can be matched without reference to direct ordering. That is to say, < √ROOT-V > is just as good as < V-√ROOT > insofar as the structural spans are relevant to exponent specifications.